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**DOE-STD-1104-96
February 1996**

DOE STANDARD

REVIEW AND APPROVAL OF NONREACTOR NUCLEAR FACILITY SAFETY ANALYSIS REPORTS



**U.S. Department of Energy
Washington, D.C. 20585**

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CONTENTS

FOREWORD	v
Introduction	1
Applicability and Scope	1
1. MANAGEMENT AND COORDINATION	3
1.1 Responsibilities and Authorities	3
1.2 Planning	4
1.3 Interactions	6
1.4 Issue Origination and Resolution	6
2. APPROVAL BASES	9
2.1 Base Information	9
2.2 Hazard and Accident Analyses	11
2.3 Safety Structures, Systems, and Components	12
2.4 Derivation of Technical Safety Requirements	13
2.5 Programmatic Control	13
3. SAFETY EVALUATION REPORTS	15
3.1 Title Page	17
3.2 Signature Page	17
3.3 Executive Summary	17
3.4 Review Process	17
3.5 Base Information	18
3.6 Hazard and Accident Analyses	18
3.7 Safety Structures, Systems, and Components	18
3.8 Derivation of Technical Safety Requirements	19
3.9 Programmatic Control	19
3.10 Records	19

List of Tables

Table 2–1 Correlation between DOE–STD–3009–94 guidance, DOE 5480.23 requirements, and SAR approval bases	10
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FOREWORD

1. This Department of Energy (DOE) Standard, DOE-STD-1104-96, "Review and Approval of Nonreactor Nuclear Facility Safety Analysis Reports," is approved for use or reference by DOE or its contractors.
2. DOE 5480.23, "Nuclear Safety Analysis Reports," issued April 1992, establishes requirements for nuclear facility safety analysis reports. The guidance contained herein on interpreting and implementing this Order and any corresponding regulations (e.g., proposed Price-Anderson Amendments Act Rule, 10 CFR 830.110) provides enhanced safety assurance.

The approach to safety management at DOE is communicated through a hierarchy of directives that provide a logical structure for establishing and implementing policy. At the top of the hierarchy are safety Policy Statements, followed by safety requirements (Regulations, Orders, Immediate Action Directives, Notices, and Manuals) that identify implementing actions required to put policy into effect. Below the safety requirements are Safety Guides and Implementation Guides that provide information on interpretation of requirements and nonmandatory means of implementing requirements. Technical Standards, such as this document, support the hierarchy of directives by providing consistent guidance on criteria for acceptable performance.

This Standard was prepared to be consistent with DOE 5480.23 and its Attachment and should be used in conjunction with the Order and its Attachment.

3. Beneficial comments (recommendations, additions, deletions) and any pertinent data that may be of use in improving this document should be sent by letter to:

U.S. Department of Energy Technical Standards Program Office
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DOE-STD-1104-96

GUIDING PRINCIPLES

The following guiding principles pertain to the application and provisions of this Standard.

- DOE-STD-3009-94, "Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports," July 1994, provides approved guidance for meeting the requirements of DOE 5480.23. Developed consistent with and as a companion to DOE-STD-3009-94, this Standard does not reiterate the provisions of DOE-STD-3009-94.
- Cognizant Secretarial Officers (CSOs) may assign responsibility to their designees for Safety Analysis Report (SAR) review and approval and delegate authority commensurate with this responsibility. Through such actions, a CSO establishes a new SAR approval authority but does not relinquish the ultimate responsibility and authority in ensuring adequate performance of that approval authority. In carrying out assigned responsibilities, the approval authority, if not the CSO, is at all times accountable to the CSO.
- Independent review of a SAR facilitates achieving defensible approval of that SAR. Since both the preparation and the review and approval of a SAR may fall under the purview of the approval authority, independent review is achieved by designating a review team leader with the responsibility and authority to conduct independent assessments. The review team leader is independent of any responsibility for preparation of the SAR under review.
- The approval authority is the single point of contact between DOE and the facility contractor for all areas of SAR review and approval. In this capacity, the approval authority serves as the focal point through which DOE interfaces with the facility contractor and from which directions to the facility contractor originate. This is accomplished through the review team leader and in coordination with official contractor interfaces.
- DOE is responsible for both the operation and regulation of the facilities for which SARs are required. This dual role places fundamental limits on the ability of DOE to completely segregate the processes of SAR preparation and review. It is not expected that SAR reviews will be conducted completely separate from SAR preparation. This Standard encourages interface between the two processes to develop familiarity with the facility's safety basis, to respond to requests from the SAR preparer for early identification and resolution

DOE-STD-1104-96

of potential issues, and to discern the scope of subsequent SAR review and the extent of approval documentation required.

- DOE strives for an effective, streamlined SAR review and approval process while still achieving an acceptable level of safety assurance. This Standard advocates proper planning for a review and encourages an integrated review process where all parties with vested interest in a facility safety basis coordinate throughout the review and approval of a SAR.
- DOE manages SAR review issues requiring resolution for SAR approval in that reviewers establish and document the safety significance of issues prior to submittal for possible resolution. Guidance is provided to focus facility contractor's resolution of issues on those issues determined to be necessary for adequately establishing and documenting the facility safety basis.
- This Standard provides guidelines for reviewing a SAR through assessment of the five major subject areas of a safety analysis as defined by the following five approval bases:
 - Base information;
 - Hazard and accident analyses;
 - Safety structures, systems, and components;
 - Derivation of technical safety requirements; and
 - Programmatic control.
- The Safety Evaluation Report (SER) is primarily a management document that provides the approval authority the basis for the extent and detail of SAR review and the basis for and any conditions of SAR approval. This Standard endorses the concept that the contents of a SER are concise summary statements and that little benefit is gained from the wholesale recapturing of elements already contained in a DOE-owned SAR or from reproducing original analysis that, if deemed critical, is performed as part of the review process.

DOE-STD-1104-96

- SERs document the bases for approving SAR revisions, including annual updates. SAR revisions determined to not involve an unreviewed safety question (USQ) in accordance with DOE 5480.21, "Unreviewed Safety Questions," are considered administrative and/or editorial in nature and may be reviewed and approved by DOE subsequent to implementation of the SAR changes by the facility contractor.

DOE-STD-1104-96

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INTRODUCTION

Safety and health assurance may be increased by standardizing the process of reviewing and approving SARs. Although complete standardization of the process (e.g., standardized review plan) requires substantial commitments and is complicated by the diversity of facility operations throughout the DOE complex, certain benefits are gained by standardizing fundamental elements of the SAR review and approval process. To that end, this Standard establishes DOE guidelines for the review and approval of SARs, including preparation of SERs, for nonreactor nuclear facilities.

APPLICABILITY AND SCOPE

Guidance provided by this Standard is applicable to the review and approval of SARs and revisions thereto, including required annual updates (i.e., DOE 5480.23 annual updates), for existing nonreactor nuclear facilities. Therefore, this Standard is appropriate for Hazard Category 1, 2, or 3 nonreactor facilities (classified in accordance with DOE-STD-1027-92, "Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports") that document their safety basis in accordance with DOE 5480.23. For new facilities in which conceptual design or construction activities are in progress (i.e., Preliminary SARs, Final SARs), the review and approval process is much more focused on adequacy of proposed design for safety and on confirming that construction is within approved design. Provisions of this Standard may be applied to the process of reviewing and approving SARs documenting conceptual and/or preliminary designs to the extent judged to be beneficial.

The body of this Standard focuses on management of the SAR review and approval process, provides guidelines for establishing the basis of SAR approval, and recommends a format and content of SERs. Specific review guidelines that are technical in nature are more appropriately addressed individually by subject matter and require more detailed guidance and discussion. Therefore, the body provides general guidelines as opposed to a comprehensive list of technical safety criteria (e.g., standardized review plan). More technical aspects of SAR review, or closely affiliated review guidance, may be disseminated to the DOE complex by appending this Standard.

For nonreactor nuclear facilities under the purview of the Office of Nuclear Energy, Science and Technology, the use of this Standard in the review and approval of a specific SAR should be discussed with and agreed to by the appropriate program office. This Standard is applicable to government-owned, government-operated (GOGO) facilities in which DOE performs the functions of the facility contractor.

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1. MANAGEMENT AND COORDINATION

1.1 Responsibilities and Authorities

DOE 5480.23 states that the CSO or a designee in the line organization shall “review and approve Safety Analysis Reports and revisions thereto for all nuclear facilities and operations” and “issue a Safety Evaluation Report that documents the bases upon which the approvals have been made.” DOE 5480.23 also recognizes organizational entities with responsibility for monitoring and auditing implementation of the Order. By assigning responsibilities for SAR review and approval to another individual, the CSO establishes that individual as the new approval authority. Assigning responsibilities carries concurrent delegation of authority recognized by line management and by those responsible for monitoring and auditing implementation of the Order.

The approval authority for a SAR is responsible for providing a defensible review and approval of the SAR. Achieving defensible review and approval is facilitated by an independent review process. Since both the preparation of the SAR and its review and approval typically fall within the purview of the approval authority, the approval authority assigns a review team leader the responsibility of performing the independent review. In making the assignment, the approval authority ensures that the review team leader maintains sufficient independence of the line organization responsible for the SAR preparation (i.e., no responsibility for preparation of the SAR under review) and possesses the technical competence relevant to the SAR of concern. The details of independently reviewing the SAR, up to and including recommending SAR approval to the approval authority, are managed by the review team leader.

The approval authority has responsibility as the single point of contact between DOE and the facility contractor for all matters regarding review of the SAR. This responsibility is typically assigned to the review team leader, but the approval authority remains the final authority on any points requiring arbitration. The single point of contact is the focal point through which DOE and the facility contractor interface and from which directions to the facility contractor originate. Requests for any SAR material, determination of the significance of identified issues on such material, and direction to the facility contractor for resolution of issues are approved by the single point of contact. As appropriate, transmittal of official communications and directions involving significant work effort by the facility contractor are coordinated with the facility Contracting Officer. Line management personnel and representatives of organizations responsible for monitoring and auditing DOE 5480.23 implementation coordinate their activities through the single point of contact as well.

The approval authority has the specific responsibility of ensuring that the review and approval process represents all DOE entities with vested interest in the facility

under review and considers commitments made to agencies outside DOE. Agencies external to DOE, however, have no standing under the Orders/Rules structure for approval. Identifying safety issues and their resolution may involve negotiations between concerned organizations. Discounting a safety issue raised by any vested interest without giving the issue proper consideration could reduce safety assurance.

On behalf of the approval authority, the review team leader coordinates the day-to-day aspects of managing the SAR review and approval process. General responsibilities in this capacity include:

- Representing the focal point for interface between DOE and the facility contractor for SAR review matters;
- Developing a SAR review plan, including review milestones developed in consultation with the facility contractor;
- Establishing and managing the SAR review team;
- Supervising the overall review process, including planning and scheduling changes;
- Coordinating, scheduling, and arbitrating issue resolution; and
- Preparing a SER.

The approval authority does not relinquish responsibility of ensuring adequate performance of the review team leader in fulfilling assigned responsibilities. Final SAR approval and SER issuance remain an unassignable responsibility and function of the approval authority and are based on consideration of the review team leader's recommendations.

1.2 Planning

A review plan defines the extent and details of the review process deemed necessary for a given SAR. Well before SAR submittal for approval, plans should be developed in coordination with the facility contractor where support of the contractor will be required (e.g., briefings on the SAR, facility walkthroughs, issue resolution). The review plan can be very brief for the least hazardous or complex facility SARs and is generally not necessary for the review of revisions and annual updates of SARs determined not to involve a USQ. The plan should be approved by the approval authority with a copy forwarded to the facility contractor for their information. Basic components of a review plan include:

- Scope and objectives of the SAR review and their bases, including known technical-, mission-, and/or project-related influences impacting the extent and detail of SAR review;
- Methodology of the SAR review, including basic task identification, objectives, and criteria by which the review is to be conducted;

DOE-STD-1104-96

- Resources required for SAR review;
- Process and requirements for providing orientation for SAR reviewers (e.g., briefings, training on review plan and review criteria, facility walkthroughs);
- Means of coordinating SAR review (e.g., periodic monitoring of individual tasks, documentation of review efforts, formats for issue submittal and responses, tracking of issues and their resolutions, record keeping);
- Required SER reviews and signoffs;
- Schedule for the SAR review, including key milestones for the review process (e.g., dates of facility walkthroughs, briefings, and/or meetings, calendar time allotted for issue submittal and issue resolution, SER reviews, and final SER approval).

The SAR review plan is developed from a general understanding of the overall facility safety basis gleaned from existing safety basis documentation (e.g., Basis for Interim Operations), familiarity with the facility, and DOE experiences with similar facilities. Typical considerations include facility hazard category, complexity of operations, dominant accident concerns apparent, known operational and/or design vulnerabilities, existing mission or program influences (e.g., mission-related considerations and objectives) and time constraints for SAR review and approval. Careful consideration should be given to developing the review plan and any subsequent updating of the plan due to major changes in the SAR development schedule, provisions, or approach to its review. Many elements considered in planning the review will be summarized as part of the SER to document the basis of the extent and detail of SAR review. The primary focus of DOE oversight of the review process is the basis for the extent and detail of the SAR review, with secondary focus being the adequate implementation of the review. Documentation establishing the basis and conduct of the review is maintained for subsequent demonstration that the review process was complete and adequate.

An important part of planning is selecting the individuals composing the review team. Members of the review team are typically selected based on technical qualifications, experience, familiarity with the subject matter, independence from SAR preparation, understanding of DOE's safety assurance strategy (e.g., nuclear safety requirements), and availability. The review team requires a core team with expertise in process hazard analysis and accident analysis. The core of the review effort is assessing the hazard and accident analyses in the SAR because these analyses are the primary source of original material with which the remainder of the SAR is aligned. Other personnel with diverse experience in safety and health and facility operations are not necessarily members of the core team but collectively provide support as needed for a thorough assessment of the facility safety basis. The extent of support necessary is generally reflected by the hazard and complexity level of the activities being examined. Personnel resources may be

DOE-STD-1104-96

augmented with available personnel from DOE Headquarters or unaffiliated Field/Operations Offices. To support single review efforts, the review team should include representatives from any party responsible for SAR review and may also include representatives of parties responsible for oversight of SAR review and approval to monitor the review process.

1.3 Interactions

DOE has certain fundamental limits on its ability to completely separate the SAR preparation and review processes because it is responsible for both the operation and regulation of the facilities for which SARs are prepared, reviewed, and approved. Therefore, SAR reviews are not expected to be conducted completely segregated from SAR preparation. Some degree of interaction between the SAR preparation and review processes is useful in streamlining SAR review and approval. This interaction provides the means by which DOE keeps abreast of issues that arise during SAR development and by which DOE responds to requests from the SAR preparer to assist in resolving fundamental conceptual issues. It is through such interaction that DOE is afforded the opportunity to commence research on potential issues in preparation for the official review of a SAR.

It is important to maintain a balance in the interaction of the SAR review and preparation processes. Requests for SAR material outside the provisions of the review plan are made solely by the review team leader. Reviewers do not directly request draft SAR material from the SAR preparers. Informal direction of SAR preparation by reviewers is unacceptable. Tendencies exist for facility contractors to view any comment or direction offered by SAR reviewers as a firm prerequisite for SAR approval. The actual preparation of and changes to a SAR are the responsibility of SAR preparers, not the review team or its members. Therefore, comments or advice affecting SAR preparation should result from unequivocal solicitation by the SAR preparer. Even so, the review team leader, as authorized by the approval authority, is the only authority for originating any official intervention driving the content and details of a SAR. Any intervention is officially communicated by DOE to the facility contractor after ensuring that it is crucial to the development of the facility safety basis and originates from a sound technical foundation (i.e., undergone technically qualified independent review). Even then, intervention generally takes the form of guidance or recommendation and is well documented for subsequent reference by the reviewers during SAR review.

1.4 Issue Origination and Resolution

Traditionally, in reviewing SARs, both line management personnel and representatives of other organizations were known to generate a large number of comments, many of which were not commensurate with a consistent concept of the SAR and its purpose. The SAR preparer has often borne the sole burden of resolving all such comments while reviewers have not been held accountable for

justifying comments. This often resulted in forced integration of contradictory comments or comments contrary to a particular SAR approach or structure. To prevent such occurrences, the approval authority, through the review team leader, maintains authority to determine what issues are significant and are transmitted to the SAR preparer for formal (i.e., a documented, traceable, written record) resolution. For this reason, increased "burden of proof" lies with reviewers to justify the safety significance of an issue through substantiation of its impact on the safety basis if left unresolved. Each significant issue submitted should be accompanied by justification for its significance. The review team leader, and subsequently the approval authority, rely upon these justifications in determining the relevance of all issues.

A significant issue identifies a problem or concern that affects the utility or validity of the safety basis documentation. Such issues are generally those involving: (1) hazardous material or energy release with significant consequences to the public, worker, or environment that will otherwise be left without coverage in the SAR; (2) technical errors that invalidate major conclusions relevant to the safety basis; or (3) failure to cover topical material required by DOE directives and guidance on SARs. SARs prepared in accordance with DOE 5480.23 use the graded approach in documenting the facility safety basis. The absence of information in a SAR is not a potential issue unless that absence adversely impacts the adequacy of the facility safety basis documentation. For example, DOE-STD-3009-94 states that standard industrial hazards are not generically covered in the SAR. But an issue requiring that Occupational Safety and Health Administration (OSHA) controls for a standard industrial hazard be included in a SAR would be justified if a clear case can be made that the lack of such controls is a potential contributor to a significant release of hazardous material. If thorough justification of the significance of an issue is not provided and supported, then the review team leader may refrain from transmitting to the SAR preparer the issue as significant and requiring resolution. Such judgments may be appealed to the approval authority.

While only significant issues require formal resolution, the review team leader will typically transmit all issues to the SAR preparer that will improve overall SAR presentation. The SAR preparer may resolve these issues to the extent they enhance the final product without formal response. In the process outlined by this Standard, the objective is not to document a large number of issues but to contribute to improving the SAR to meet the mission established by DOE 5480.23 and the intent of amplifying guidance, (i.e., to provide assurance that the SAR appropriately establishes the safety basis of the resolutions satisfactory facility).

For issues transmitted to the SAR preparer as significant, he formally prepares resolutions and submits them to the review team leader. The review team leader transmits proposed resolutions to reviewers originating the issues, who may in turn respond if a resolution is considered unsatisfactory. All responses are transmitted through the review team leader, who schedules and arbitrates the process of

resolution. The review team leader may consider proposed in the absence of timely response or adequate justification of unacceptability by the issue originator. As a matter of course, the review team leader ensures that the SAR preparer is formally notified of acceptable and unacceptable resolutions proposed for significant issues.

Reviewers or the SAR preparer may appeal the disposition of an issue by the review team leader to the approval authority. The approval authority determines final disposition of issues as it is the ultimate responsibility of the approval authority to achieve a defensible position for the final product (i.e., determine when resolution is adequate). Neither a reviewer nor the SAR preparer has veto power over ultimate resolution or disposition of an issue and neither need be satisfied with the final resolution. The review team leader ensures the final disposition of significant issues is documented (i.e., traceable, written record), including minority opinions and dissenting views.

2. APPROVAL BASES

SAR review and approval focuses on the adequacy of the following five approval bases:

- Base information;
- Hazard and accident analyses;
- Safety structures, systems, and components (SSCs);
- Derivation of technical safety requirements (TSRs); and
- Programmatic control.

Once technical justification exists to support conclusions that the SAR adequately describes how the facility is satisfactory with respect to all five approval bases, the facility safety basis may generally be considered adequate. These five approval bases also form the foundation for documenting SAR approval in a SER. The relationship between the implementation guidance of DOE-STD-3009-94, DOE 5480.23 requirements, and the five approval bases defined in this Standard is depicted in Table 2-1.

2.1 Base Information

Base information is the first of the approval bases that should be reviewed and encompasses elements of SAR preparation, completeness, and general content. Base information is not reviewed for adequacy in and of itself but for sufficiency to allow assessment of the other approval bases that rely on this information. The review for sufficiency can range from a simple screening effort to more detailed discussions, depending on the complexity of the SAR.

Insufficient or incomplete base information in a SAR may prevent further review of the SAR. Reviewers should require resolution of major discrepancies in base information (e.g., incomplete site characteristics) before evaluation of the more specific aspects (e.g., hazard and accident analyses) of the safety basis proceeds. It is for this reason that the SER need only provide a brief statement as to the adequacy of base information.

For SARs adhering to DOE-STD-3009-94 format, the review of base information primarily determines the sufficiency of the information provided in the Executive Summary, Site Characteristics (Chapter 1), Facility Description (Chapter 2), and to some extent material generic to all SAR chapters (e.g., statutes, rules, Orders, and principal health and safety criteria). Determining the adequacy of base information generally

Table 2–1. Correlation between DOE–STD–3009–94 guidance, DOE 5480.23 requirements, and SAR approval bases.

DOE–STD–3009–94 Chapter	DOE 5480.23		Approval Bases*
	Topic	Number [S.b.(3)...]	
Executive Summary	Executive summary	(a)	1–5
Chapter 1	Site characteristics	(c)	1
Chapter 2	Facility description and operation	(d)	1
Chapter 3	Hazard analysis and classification	(e)	2
	Accident analysis	(k)	2
Chapter 4	Facility description and operation	(d)	3
Chapter 5	Derivation of technical safety requirements	(p)	4
Chapter 6	Inadvertent criticality protection	(h)	5
Chapter 7	Radiation protection	(i)	5
Chapter 8	Hazardous material protection	(j)	5
Chapter 9	Radiological and hazardous waste management	(g)	5
Chapter 10	Testing, surveillance, and maintenance	(o)	5
Chapter 11	Operational safety	(q)	5
Chapter 12	Procedures and training	(m)	5
Chapter 13	Human factors	(n)	5
Chapter 14	Quality assurance	(r)	5
Chapter 15	Emergency preparedness	(s)	5
Chapter 16	Decontamination and decommissioning	(t)	1–5
Chapter 17	Management and organization	(l)	5
Chapters 1–17	Statutes, rules, and orders	(b)	1–5
Chapters 1–17	Health and safety criteria	(f)	1–5
Chapters 1–17	Design codes and standards	(u)	1–5

* Five approval bases: (1) base information; (2) hazard and accident analyses; (3) safety structures, systems, and components; (4) derivation of technical safety requirements; and (5) programmatic control.

OE-1104-96-005-020126

DOE-STD-1104-96

entails being able to conclude that the SAR contains sufficient documentation and basis to arrive at the following conclusions:

- The facility contractor development and approval processes (e.g., personnel involvement in developing the SAR, management cognizance and acceptance, internal reviews) demonstrate sufficient commitment to establish the facility safety basis.
- The facility mission(s) and scope of operations for which safety basis approval is being sought are clearly stated and reflected in the type and scope of operations analyzed in the SAR. For example, a SAR documenting the safety basis of a spent fuel storage facility whose mission includes size reduction of spent fuel elements would be unacceptable if the SAR omitted safety analysis of size-reduction operations.
- A description of the facility's life-cycle stage, mission(s), and operation(s) is presented, including explanation of the impact on the facility safety basis.
- Clear basis for and provisions of exemptions, consent agreements, and open issues are presented.
- Descriptions of site, facility, and operational processes provide a knowledgeable reviewer sufficient background material to understand the major elements of the safety analysis.
- Correlation is established between actual facility arrangements and operations with those stated in the SAR. This may be accomplished successfully through reference to facility walkthroughs during SAR preparation. Walkthroughs may also be warranted during SAR review to provide some level of assurance that the actual physical arrangement of a facility corresponds to that documented in the SAR. For example, a walkthrough may be considered for a facility and/or operation that was modified in the time frame between SAR development was started and completed. This is not intended to imply the review team must perform detailed verifications of facility configuration. The objective is to allow the review team to conclude that the basic descriptions provided are fundamentally up-to-date and correct.

2.2 Hazard and Accident Analyses

The second of the SAR approval bases is hazard and accident analyses and forms the foundation upon which the remaining three approval bases (i.e., safety SSCs, derivation of TSRs, and programmatic control) rely. Determining the adequacy of hazard and accident analyses generally entails being able to conclude that the SAR contains sufficient documentation and basis to arrive at the following conclusions:

DOE-STD-1104-96

- The hazard analysis includes hazard identification that specifies or estimates the hazards relevant for SAR consideration in terms of type, quantity, and form, and also includes properly performed facility hazard classification.
- The hazard analysis includes hazard evaluation that covers the activities for which approval is sought, is consistent in approach with established industrial methodologies, identifies preventive and mitigative features for the spectrum of events examined, and identifies dominant accident scenarios through ranking.
- The hazard analysis results are clearly characterized in terms of defense in depth, worker safety, and environmental protection. The logic behind assessing the results in terms of safety-significant SSCs and designation of TSRs is understandable and internally consistent.
- Subsequent accident analysis clearly substantiates the findings and delineations of hazard analysis for the subset of events examined and confirms their potential consequences. Events potentially exceeding evaluation guidelines need to clearly identify associated safety-class SSCs and basis of TSR derivations.

These conclusions can typically be made without extensive independent calculations and analyses or verification and validation activities. The goal of the review is to ensure that the safety basis is comprehensive relative to hazards presented and is based on a consistent, substantiated logic.

2.3 Safety Structures, Systems, and Components

The third of the SAR approval bases is safety structures, systems, and components. Identification of safety SSCs (i.e., safety-class SSCs and safety-significant SSCs) is a product of the hazard and accident analyses. Determining the adequacy of safety SSCs generally entails being able to conclude that the SAR contains sufficient documentation and basis to arrive at the following conclusions:

- The safety SSCs identified and described are consistent with the logic presented in the hazard and accident analyses.
- Safety functions for safety SSCs are defined with clarity and are consistent with the bases derived in the hazard and accident analyses.
- Functional requirements and system evaluations are derived from the safety functions and provide evidence that the safety functions can be performed.
- Control of safety SSCs relevant to TSR development are clearly identified.

DOE-STD-1104-96

2.4 Derivation of Technical Safety Requirements

Derivation of technical safety requirements is the fourth of the SAR approval bases. Identification of TSRs results from the most significant preventative and mitigative features identified in the hazard and accident analyses and from the designation of safety SSCs. Determining the adequacy of the derivation of TSRs generally entails being able to conclude that the SAR contains sufficient documentation and basis to arrive at the following conclusions:

- The bases for deriving TSRs that are identified and described in the hazard and accident analyses and safety SSC chapters are consistent with the logic and assumptions presented in the analyses.
- Bases for deriving safety limits, limiting control settings, limiting conditions for operation, surveillance requirements, and administrative controls are provided as appropriate.

2.5 Programmatic Control

Programmatic control is the last of the SAR approval bases and encompasses the elements of institutional programs and facility management that are necessary to ensure safe operations based on assumptions made in the hazard and accident analyses. Identification of programmatic control is a product of hazard and accident analyses, designation of safety SSCs, and derivation of TSRs. Determining the adequacy of programmatic control generally entails being able to conclude that the SAR contains sufficient documentation and basis to arrive at the following conclusions:

- The major programs needed to provide programmatic safety management are identified.
- Basic provisions of identified programs are noted, and references to facility or site program documentation are provided.

The acceptance of programmatic control does not constitute acceptance of the adequacy of program compliance with DOE directives. That can only be accomplished by detailed compliance review of each of the programs, which is beyond the scope and purpose of a SAR.

DOE-STD-1104-96

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3. SAFETY EVALUATION REPORTS

The SAR review process results in the generation of a SER integral to the facility's authorization basis. The SER for a given facility or operation documents: (1) that an appropriate review of the SAR was conducted and (2) bases for approving the SAR and any conditions of approval. SAR approval signifies that DOE has accepted the SAR as appropriately documenting the safety basis of a facility and as serving as the basis for operational controls (e.g., technical safety requirements, programmatic control) necessary to maintain an acceptable operating envelope.

The SER is developed specifically to document acceptance of the SAR. Therefore, significant issues concerning the SAR are typically resolved and incorporated into the SAR before the final SER is prepared. These resolutions are documented independently of the SER as part of the review process and thus do not require repetition in the SER. Any analysis that was not performed during SAR preparation but is determined to be required to complete the review is also documented independently of the SER. Only statements pertinent to accepting the facility safety basis are included in the SER. In accomplishing this, informed judgment and discretion are used to focus the SER on facts that clearly reflect the actual conditions of the facility safety basis. The SER does not need to repeat in wholesale fashion material contained in the SAR.

The SER is not intended to provide reanalysis of those activities already assessed in the SAR (i.e., independent verification and validation), nor is it typically anticipated that the SER will contain new material intrinsic to the requirements for a SAR (i.e., SARs should be technically complete). The SER clearly states any conditions of approval that impose additional commitments to which facility management must adhere beyond those already documented in the SAR. In general, conditions that could be incorporated into the body of the SAR are so incorporated during the review process as prompted by issue resolution (as opposed to being addressed in the SER and potentially invalidating portions of a SAR). However, if necessary, the approval authority can expedite SAR approval by defining specific conditions of approval in the SER without requiring revision of the SAR.

Approval statements addressing specific areas of the safety basis are augmented with brief summaries of the most significant facility-specific points in those areas to provide a basic context to understand what is being approved. In stating the adequacy of the approval bases, it may also prove advantageous and/or warranted for the SER to discuss areas of concern or issues with significant ramifications for facility operations. Generally, these issues will have been resolved and any inquiries into them will have been completed during the review process. Any discussion of issues in the SER should be on a summary level and directed towards clarifying some specific aspect of SAR approval or demonstrating understanding of some aspect of the facility safety basis.

DOE-STD-1104-96

If the SER imposes a condition of approval (e.g., additional compensatory measures, alterations of stated commitments) on the facility safety basis documented in the SAR, then the SER necessarily modifies that facility safety basis. In such cases, conditions cited in the SER become part of the facility safety basis. Therefore, a facility safety basis is composed of an approved SAR modified as necessary by the SER to reflect DOE-imposed conditions of authorization. The SER or a memorandum stating the conditions is subsequently appended to the SAR. Specification of conditions in the SER not currently in place in the SAR should identify an expected schedule for completion.

SAR revisions, including annual updates, undergo review and approval. Review and approval of SAR revisions are a matter of endorsing the incorporation of changes in the safety basis since the last approval rather than performing a new assessment of the entire previously approved SAR. Modifications to the facility operations not encompassed by the safety basis as documented in a SAR invoke the USQ process. Therefore, revisions are generally administrative and/or editorial in nature in that they incorporate final disposition of USQs, any conditions of approvals stated in the existing SER, and/or minor changes that clarify the safety basis documentation. For this reason, administrative and editorial SAR revisions determined to not involve a USQ, can be performed by the facility contractor at any time without prior DOE approval. The facility contractor provides a copy of the revision, with a discussion of changes, to the approval authority within thirty (30) days of implementing the change for subsequent DOE review and approval. Review and approval of SAR revisions do not typically warrant significant new effort (e.g., detailed review plan, formal review team) and may be as simple as merely indicating the latest revision numbers for simple administrative and/or editorial changes.

SERs document the bases for approving SAR revisions, including annual updates. A SER for a SAR revision typically does not provide the complete basis of approval for that SAR and only provides the basis of approving changes in the SAR provisions resulting from the revision. Therefore, SERs for SAR revisions are appended to the SER documenting the last comprehensive determination of the basis of approval of the SAR. Collectively, a SER and its appendices provide the complete basis of approval for any given SAR. A SER without appendices is generated upon the next comprehensive determination and documentation of the basis of approval for that SAR, or at the discretion of the approval authority.

The remainder of this chapter provides the recommended format and content for a SER. The SER addresses only those issues that are germane to documenting the basis of SAR acceptance; therefore the SER is subject to the graded approach. Summaries of material already contained in a SAR should be brief but sufficient to provide a knowledgeable reader a basic understanding of the basis of approving that SAR.

DOE-STD-1104-96

3.1 Title Page

The title page provides the unique identifier information for both the SAR and the SER. Minimum information consists of: (1) SER title, revision number, and date issued; (2) SAR title, revision number, and date issued; (3) facility name and identification number, if any; (4) site; and (5) DOE contractor's name and appropriate contract number.

3.2 Signature Page

The signature page provides the identification and signature of the approval authority, and the date of SAR approval. Other signatures may be provided at the discretion of the approval authority.

3.3 Executive Summary

This section presents summary information regarding the basis of SAR approval. The introduction contains the following information, briefly summarized: (1) clear identification of the facility for which SAR approval is being granted and its hazard category; (2) statement of the facility mission and scope of operations encompassed by the facility mission; (3) summary of the major facility hazards and dominant accident scenarios; (4) discussions of pertinent exemptions and/or consent agreements impacting the SAR approval; (5) discussions of major mission- and project-related influences impacting the decision to authorize operation; and (6) any conditions of approval and/or open issues raised with regard to the five approval bases, including schedules for completion (if applicable). The executive summary concludes with a statement on the acceptability of the SAR indicating that the SAR has undergone an appropriate review and that the facility safety basis as documented is acceptable with stated conditions of approval, if any.

3.4 Review Process

This section provides a brief description of the review process the SAR has undergone and its basis. Because there is no generic level of review effort required, this section is more the historical top-level documentation of the review process and the rationale for level of effort and detail. Typical information summarized includes: (1) basic premises of review, particularly those representing some consensus with the SAR preparer; (2) summation of the review effort; (3) key participants in the review process; and (4) scope of special efforts, if any (e.g., selected independent calculations, walkthroughs). Discussion should be brief but still sufficient to provide an understanding of the thoroughness of the review process and its basis. This section does not provide a documented record of the details of review (e.g., issue resolution files).

DOE-STD-1104-96

3.5 Base Information

This section documents the bases of approving the adequacy of base information, including any conditions of approval imposed. A statement of adequacy is generally focused and brief. This may entail nothing more than a paragraph stating that the SAR contains sufficient background and fundamental information to support the review of the more technical aspects of the SAR (i.e., review of the remaining four approval bases). The majority of any inadequacies in the base information will require revision to the SAR prior to SER preparation or may be sufficiently minor that they can be resolved in a future SAR revision.

In addition to bases of acceptance, this SER section provides a brief synopsis of major site, facility, and operational process features. This information is intended for the sole purpose of providing a minimal, facility-specific context for SER bases of approval, such that an elementary understanding of the operational envelope can be gleaned from the SER. The SER does not, however, attempt to repeat detailed safety basis information contained in the SAR.

3.6 Hazard and Accident Analyses

This section documents the bases for approving the hazard and accident analyses, including any conditions of approval imposed. Such documentation focuses on the completeness of the analysis and the consistency of the logic used throughout the analysis process.

In addition to bases of acceptance, this SER section provides: (1) a brief synopsis of hazards identified; (2) fundamental aspects of defense in depth, worker safety, and environmental protection; (3) dominant accident potentials; and (4) accident consequences relative to DOE-STD-3009-94 Evaluation Guidelines. The purpose of summarizing this information is not to recapture detailed information already presented in the SAR. The summary provides the reader an elementary understanding of the major facility hazards. In summarizing this information, the SER does not repeat the details of SAR assumptions or calculations. The SER may, however, discuss essential aspects of important issues resolved during the review process.

3.7 Safety Structures, Systems, and Components

This section documents the bases for approving the designation of safety SSCs and their associated safety functions, functional requirements, system evaluations, and potential TSR coverage, including any conditions of approval imposed. Focus is on the consistency of the logic developed in hazard and accident analyses being carried through to the identification of safety SSCs and the definitions and descriptions provided for these SSCs.

DOE-STD-1104-96

In addition to bases of acceptance, this SER section provides a brief synopsis of safety SSCs and their safety functions as determined in the hazard and accident analyses. The purpose of summarizing this information is not to recapture detailed information already presented in the SAR. The summary provides a reader an elementary understanding of the safety SSCs and the bases of their designation in hazard and accident analyses. The SER may, however, discuss essential aspects of important issues resolved during the review process.

3.8 Derivation of Technical Safety Requirements

This section documents the bases for approving the derivation of TSRs, including any conditions of approval imposed. Such documentation focuses on the consistency of the logic developed in the hazard and accident analyses and safety SSC chapters being carried through to the derivation of TSRs. The TSRs required by DOE 5480.22 are not specified in a SAR, which is only required to provide the basis of their derivation.

In addition to bases of acceptance, this SER section provides a brief synopsis of the derivation of TSRs as a function of the hazard and accident analyses. This information is intended for the sole purpose of providing minimal, facility-specific context for SER bases of approval, such that an elementary understanding of the operational envelope can be gleaned from the SER. The SER does not, however, attempt to repeat detailed information contained in the SAR.

3.9 Programmatic Control

This section documents the bases of approving programmatic control, including any conditions of approval imposed. These bases do not relate to compliance with regulatory requirements, but to identification of the basic capability and awareness of fundamental provisions needed for maintaining the adequacy of the facility safety basis. Approval of programmatic control simply documents that the basic elements of the institutional programs depended on for ensuring the facility safety basis are adequate and that these elements can and will be implemented. A list of these programs briefly noting their general significance to defense in depth, worker safety, and/or dominant accident scenarios is provided, but no summary of the information from each programmatic chapter is needed.

3.10 Records

This section provides references to the essential records, documentation, and information generated throughout the review process. This may include reference to records of: (1) the SAR review plan and schedule; (2) minutes of review meetings, including meetings with the facility contractor; (3) dates and results of facility walkthroughs; (4) submittal of issues and their disposition; (5) documentation generated in resolution of issues; and (6) documentation regarding

DOE-STD-1104-96

commitments made by the facility contractor for SAR approval. References should be complete and accurate enough to locate necessary information during future SAR revision and review activities, if needed.

DOE-STD-1104-96

CONCLUDING MATERIAL

Review Activities:

Preparing Activity:

DOE HeadquartersDOE Field Organizations,
Laboratories, and M&O Contractors

DOE EH-31

Project Number:

SAFT 0032

DP	AAO	KAO	PETC
EE	ALMO	KCAO	PIAO
EH	ALO	KEH	PNL
EM	ANL	LAAO	PPPL
ER	ARAO	LANL	PRAO
FE	ASKC	LBL	REEC
NE	BAH	LLNL	RFO
HR	BAO	LMIT	RFP
IS	BDM	MAO	RLO
NN	BNL	METC	RSN
	BPA	MKF	SAIC
	BTAO	LMES	SLAC
	CAI	M&H	SNLA
	CHO	MMSC	SNLL
	EMI	MND	SRO
	EML	NVO	SURA
	ETEC	OHO	TRW
	FAO	OAK	UCMC
	FNAL	ORAU	WAPA
	GFO	ORNL	WHC
	GJPO	ORO	WPSO
	IDO	OSTI	WSLV
			WSRC

DOE-STD-1104-96

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